- Price declines have continued because of rapid productivity growth and declining costs.
- Prices have declined by much more than just the decrease in access charges.
- Competition has proven a highly effective policy approach for the long-distance industry.
- Permitting the RBOCs to control long-distance carriers would clearly be harmful. The line-of-business restriction on long distance is sound policy.

Chapter 1. Public Benefits since Divestiture

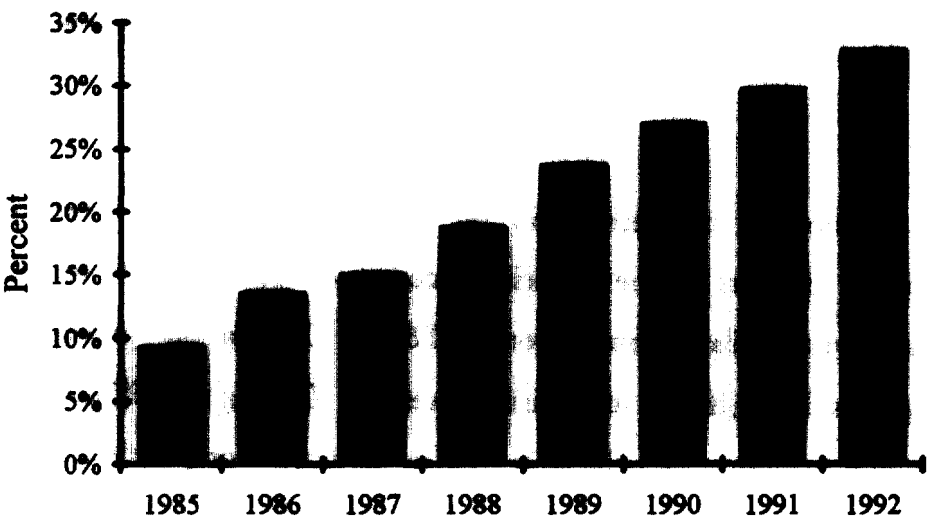
Structure and Performance of the Long-Distance Industry since Divestiture

Increasing competition in the long-distance industry has delivered important benefits to the American economy. Traditionally, long-distance service was available only from AT&T. Regulation prevented other companies from offering long-distance service. During the 1970s, MCI waged an uphill battle to obtain the right to offer service in competition with AT&T, but there was still little rivalry in the industry by the early 1980s.

The divestiture of long distance from local telephone companies came as a result of the settlement of the U.S. government's antitrust case against AT&T, effective at the beginning of 1984. Divestiture started the transition to competition in long distance. The new policy eliminated the economic incentive for the local telephone company to favor the long-distance carrier

owned by the company's parent. Divestiture brought equal access, under which telephone subscribers have a symmetric choice among all long-distance carriers. Subscribers use the same convenient method to dial long-distance calls for all carriers. The Federal Communications Commission (FCC) has made other contributions to creating a favorable environment for competition by expanding equal access to independent local telephone companies, by requiring portability of 800 numbers, and controlling some anti-competitive practices.

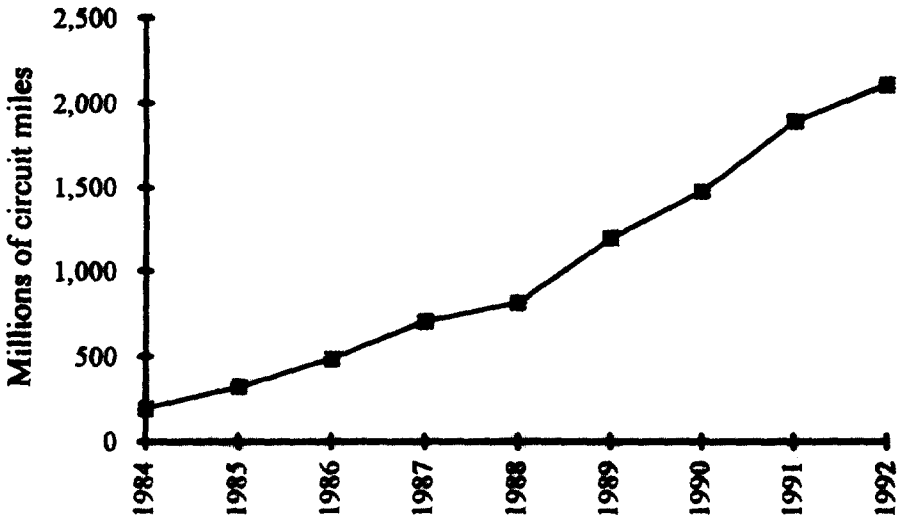
Figure 1. MCI's Minutes of Service as a Percent of AT&T's



The mid-1980s saw an explosion of service by long-distance carriers other than AT&T. During this time, MCI and Sprint built nationwide networks and gained acceptance as alternatives to AT&T. Figure 1 shows the ratio of minutes of service provided by the leading rival, MCI, to AT&T.

MCI rose from less than 10 percent of AT&T in 1985 to about a third of AT&T in 1992. As shown in Figure 2, MCI had 198 million circuit miles in its network in 1984 and 2.1 billion circuit miles in 1992. Total fiber-miles of long-distance carriers in the United States rose from 456,000 in 1985 to 2.4 million in 1992, of which less than half was owned by AT&T.[1] These statistics demonstrate that the market has undergone a significant transformation over the past decade. Divestiture was successful at stimulating major new investments with corresponding increases in market shares by new entrants to the long-distance market.

Figure 2. MCI's Circuit Miles



[1] Jonathan Kraushaar, *Fiber Deployment Update*, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, April 1993.

Government Price Indices for Long Distance

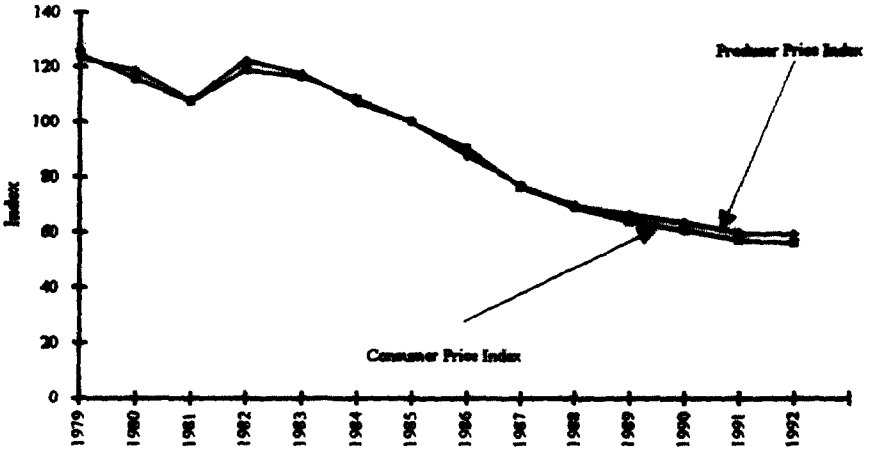
The price of long-distance service is the primary indicator of the gains the public has achieved from the structural transformation of the industry. As Figure 3 shows, prior to the introduction of competition in long distance, the price of long-distance service was stable in relation to prices in general. With the advent of competition, particularly with the divestiture of long-distance services from local telephone companies at the beginning of 1984, and the provision of equal access to competing long-distance carriers, the price of long-distance service fell precipitously.

Over the period from the late 1970s to the present, only the price indices compiled by the U.S. government are available as consistent measures of prices. While these indices tell the story of the significant price decreases brought about by divestiture, a fuller picture is available for more recent years from alternative measures of price that I will discuss shortly.

Figure 3 shows the history of the price of long-distance services as measured by the official price indices of the U.S. government. The indices are, first, the component of the Consumer Price Index for interstate toll calls and, second, the component of the Producer Price Index for interstate

message toll service. Both indices exclude international calls. Figure 3 presents them as ratios to a general price index, the implicit deflator for gross domestic product.

Figure 3. Government Indices of Long-Distance Prices Relative to the General Price Level



The decline in the CPI measure, relative to the GDP deflator, was 34 percent between 1983 and 1987, and the decline in the PPI was also about 34 percent. Between 1987 and 1992, these measures further declined by 26 percent for the CPI and 23 percent for the PPI.

Three factors were responsible for the sharp decline in the price of long-distance service relative to the general price level over the past decade:

- Competition made possible by divestiture,
- Improvements in productivity, and
- Declining access charges paid to local telephone companies.

Some observers have argued that the decline in long-distance rates was due entirely to the reduction in access charges. Later in this section I will show, on the contrary, that long-distance prices have fallen, relative to the general price level, even when access charges are netted out. Competition and productivity growth have been important factors in the improved performance of the long-distance industry over the past decade.

Comparison of Government Indices to Company Data

Data from the Bureau of Labor Statistics (BLS) do not present a complete picture of long-distance prices. The evidence suggests that BLS data understate recent declines in those prices. Construction of price indices for products such as long-distance service presents a serious challenge to the Bureau of Labor Statistics. For the Consumer Price Index (CPI), the BLS collects a sample of calls placed by households. In this respect, the CPI is a transactions price index, not an index of list prices. However, the conceptual framework of the CPI tends to understate price declines that occur as a result of the introduction of new products, such as discount plans, and the shift of consumer purchases toward cheaper products. Between revisions, the CPI is the price of a basket of long-distance purchases by the representative household. If the household switches to a new product not in the basket, and the new product is a cheaper alternative to a product in the basket, the CPI overlooks the effective price decline that has occurred.[2] In light of the

[2] A good example is the following: Prior to 1987, the CPI included only AT&T calls. When other carriers were added to the index in 1987, the new index was adjusted so that it had the same value as the old index in 1987. Although the cost of

extensive use of discount and promotional plans in the long-distance market since divestiture, the omission of these factors from the CPI has led to a substantial understatement of price decreases.

Measurement challenges in the Producer Price Index (PPI) are even greater. Products included in the interstate MTS index were those in existence in the mid-1970s. The only interexchange carrier included in the index is AT&T. Moreover, the index specifically excludes business toll discount plans.

One way to check the magnitude of the measurement biases in the CPI and PPI is to compare their values to the carriers' revenue per minute. Revenue per minute is the ratio of toll call revenue (billed by the minute) to the number of billed minutes. Although revenue per minute is not a perfect measure of the price of long distance, it is the best available measure.[3] Figure 4 compares revenue per minute for AT&T, MCI, and Sprint to the CPI and the PPI for the period 1985 through 1992 (both are stated as ratios to the GDP deflator, with 1985=100). For consistency with the CPI and PPI, and to avoid mix effects, these calculations exclude international calls. Figure 4 shows that revenue per minute has declined by substantially more than the

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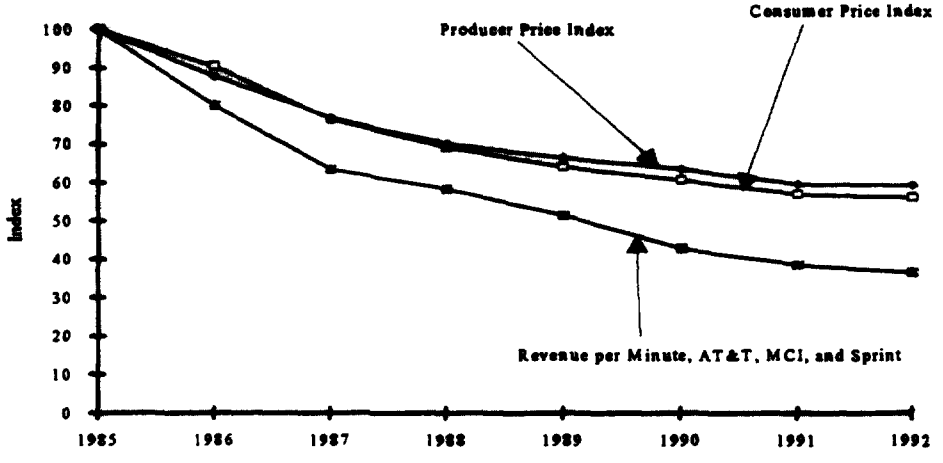
a basket of calls was lower if some of the calls were made on other carriers, the effect was eliminated by a multiplicative adjustment. Hence the consumer benefit from the lower prices of other carriers never was recorded in the CPI.

[3] One of the potential problems in revenue per minute as a measure of prices is mix effects–revenue per minute could rise even though each type of call was cheaper per minute because customers were making a larger fraction of expensive calls, such as credit-card calls. I looked at confidential MCI data by detailed product category to determine that mix effects are a minor influence on MCI's revenue per minute; essentially all the decline comes from lower prices for calls and none from changes in the mix of calls. It is entirely reasonable to conclude that mix effects are also a minor influence on revenue per minute industrywide.

official price indices. The indices have substantially understated the benefits consumers and businesses have received from long-distance price reductions that take the form of discounts and new products.

Since 1985, long-distance prices have fallen by 63 percent relative to the general price level, based on the more accurate standard of revenue per minute.

Figure 4. Indices of Revenue per Minute, Relative to the General Price Level



The Role of Declining Access Charges in Lowering Long-Distance Prices

Long-distance carriers pay local telephone companies access charges for carrying long-distance calls from the caller's business or home to the point where the long-distance carrier picks up the call. They pay a second access fee to a local telephone company to deliver the call to its ultimate destination. During the 1980s, the Federal Communications Commission imposed important changes on the structure of access fees--early in the decade, most of the fee was imposed as a per-minute charge on long-distance calls, whereas by the end of the decade, part of the fee had been shifted to a fixed monthly charge per telephone line.[4]

Figure 5 shows gross revenue per minute for the three largest carriers on the top line; these are the same numbers as those shown in Figure 4, but stated here as 1985 dollars per minute, rather than as an index. The graph also shows the industry average access charge per minute of call, again in 1985 dollars per minute[5]. The average access charge fell from 15 cents per minute of conversation in 1985 to about 6 cents in 1992 (adjusted for inflation). Finally, Figure 5 shows average revenue per minute after subtracting access cost. Revenue net of access charges fell from 15 cents per minute in 1985 to

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[4] Long-distance carriers still pay more than 40 percent of their revenues to local telephone companies as access charges.

[5] This calculation is based on the assumption that there are two minutes of access per minute of call (approximately one minute on the originating end and one minute on the terminating end). It also adjusts for call setup time and for access by means other than the local switched network.

5.1 cents in 1992 (adjusted for inflation), a decline of 66 percent. Claims that the only reason for the decline in long-distance prices is the declining cost of access are incorrect.

Figure 5. Revenue per Minute and Access Charges for the Three Largest Carriers

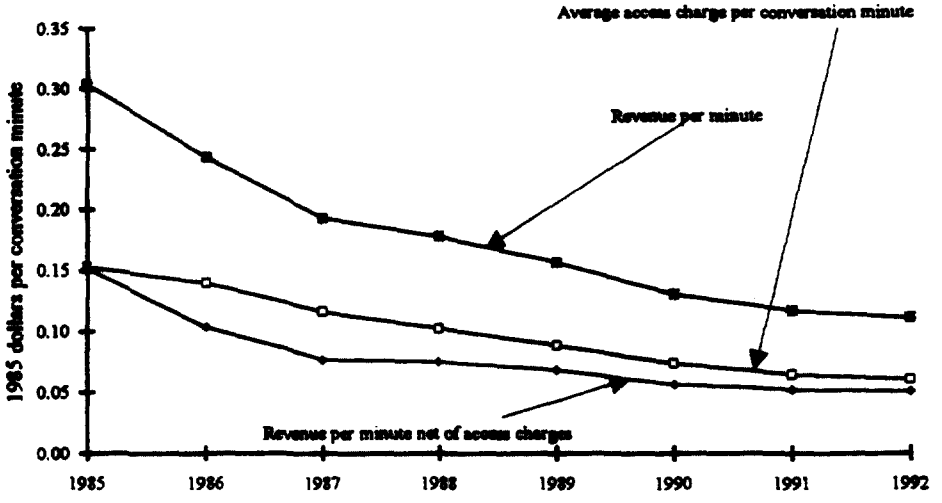

Figure 5 shows that the fall in the price of long-distance service net of access charges occurred in both the period immediately following divestiture and in more recent years. Although falling access charges were an important factor in the substantial decline in the price of long distance over the period, other factors were also significant, reflecting the successful performance of the competitive long-distance industry in the United States.

AT&T's Performance under Price Cap Regulation

Another way to study long-distance prices net of access charges is to review AT&T's performance under the FCC's price cap regulations.[6] The price caps establish a standard for AT&T's prices relative to three factors: (1) the GNP deflator, (2) access charges and other exogenous factors determined by regulators, and, (3) a 3 percent annual productivity factor. This standard is expressed in a Price Cap Index. The price-cap procedure has also resulted in the calculation and submission of price indices by AT&T for various AT&T product categories, called Actual Price Indices. Figure 6 shows the price indices for Basket 1 (regular long-distance calls), for the residential part of Basket 1, and for Basket 2 (800 calls). I used the adjustment for access and other exogenous charges implicit in the FCC's Price Cap Index to net out these costs. Also, in keeping with the other figures presented in this study, I have put the AT&T price data in constant dollars to eliminate the effect of inflation.

Figure 6 confirms that AT&T prices have fallen in all categories–residential as well as business–relative to the general price level, and that the fall is more than would be explained by declining access charges by themselves.

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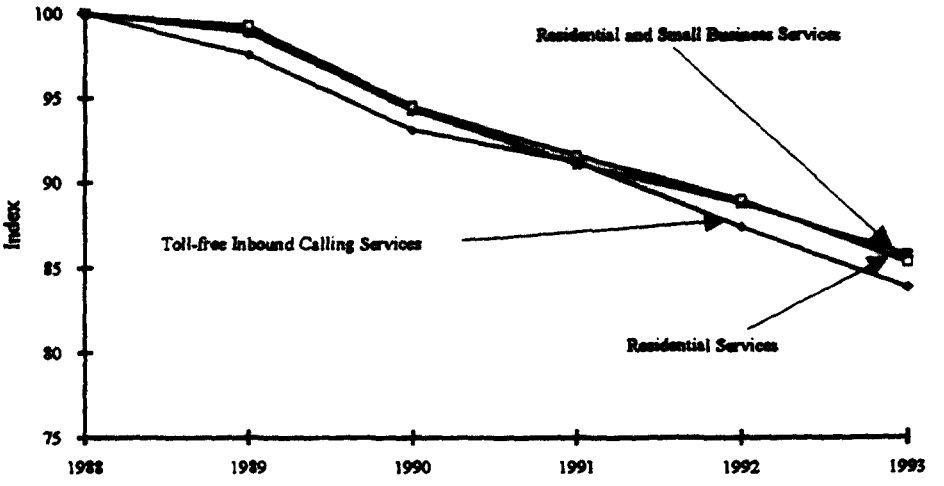
[6] Federal Communications Commission, *Report in the Matter of Price Cap Performance Review*, CC Docket No. 92-134, July 23, 1993

Figure 6. AT&T's Price Net of Access Charges



Long-Distances Price Changes Inferred from Revenue Effects

The conclusion that long-distance prices fell as a result of competition made possible by divestiture has been challenged by William Taylor.[7] Peter Huber has cited Taylor's study as a reason to doubt the effectiveness of competition in long-distance markets.[8] The Taylor study argues that the substantial declines in the price of long-distance since divestiture are entirely

[7] "Effects of Competitive Entry in the U.S. Interstate Toll Markets: An Update" National Economic Research Associates, Inc., May 28, 1993 and William Taylor and Lester Taylor, "Postdivestiture Long-Distance Competition in the United States" *American Economic Review Papers and Proceedings*, vol. 83, pp. 185-190, May 1993.

[8] See Chapter 2, below.

the result of lower access charges and not the result of any improvements in the performance of the industry since divestiture. The study's approach to the data is quite indirect. It does not rely on any of the available data on long-distance prices net of access charges. Rather, the study cumulates AT&T's estimates of the revenue and cost effects of changes in its prices, on the one hand, and access charges, on the other hand, and finds that cumulative access charge reductions are somewhat larger than cumulative price reductions.

Taylor's indirect method understates actual price reductions. The method records only the effects of changes in tariffed rates, and even for them, it considers only the effect on existing business. Price improvements achieved by customers through switching their purchases to lower-priced products completely escape the method. The effect is substantial. According to Taylor, AT&T's price fell by 8.3 percent since 1987. Over the same period, by contrast, AT&T's revenue per minute actually fell by 29.2 percent. It appears that the large difference is the result of promotions, discount plans, and shifts of demand among products, all of which escape measurement under the indirect method.

The Taylor study's pessimistic conclusion about the effects of competition is reversed when its defective measure of prices is replaced by a more accurate one. Figure 5 shows that prices for the three largest carriers fell more than can be accounted for by the decline in access charges. Figure 6 confirms that the calculations underlying the AT&T price cap also show that AT&T's prices fell relative to a standard based on access charges and other exogenous elements of cost.

Conclusions about the Price of Long-Distance Service since Divestiture

After divestiture provided the opportunity for full competition in the long-distance market in the United States, competition acted quickly to lower prices. Increasing competition and rising productivity were driving forces, although declining access charges were also a factor in lowering long-distance prices. The decline in the price of long distance was most rapid just after divestiture, but has continued since 1987 at a less precipitous rate. The economic analysis of the benefits of competition teaches that competition will drive prices toward the level of cost. During the transition from noncompetitive prices to competitive prices, large price reductions will occur. After the benefits of competition are achieved, the economy continues to enjoy low prices, but cannot expect prices to continue falling at their earlier rate. Future declines in long-distance prices will come from continuing improvements in productivity and from any further declines in access charges granted by regulators or resulting from structural changes in local telephone service.

Technical Improvement and New Services since Divestiture

Even the occasional user of long distance in the United States is aware of tremendous improvement in the quality of service in the past decade.

Background noise, cross-talk, echoes, and dropped calls have essentially disappeared from long-distance calls. The usefulness of one minute of telephone conversation has risen over the period at the same time that the cost of that minute has fallen dramatically. Fiber optics account for much of the improvement. State of the art fiber has advanced from under a trillion bits per second in 1986 (capacity for 10,000 simultaneous phone calls) to 2.4 trillion bits per second in synchronous optical networks today. In addition, the new dispersion-shifted fiber technology requires half as many regenerators per mile in the network. These advances in long-distance technology have lowered costs and improved reliability. The carriers brought into being as the AT&T monopoly was broken up–MCI chief among them–have been leaders in advanced fiber technology.

Other improvements in technology have occurred recently in the competitive long-distance industry. These include the move to digital switching and the implementation of Common Channel Signaling System 7. The combination of these two technologies have contributed to improved quality and lowered costs by reducing call setup times. Quality and reliability of long-distance service have been augmented by advanced computerized network management systems. While the long-distance industry has made a major commitment to building the most advanced telecommunications infrastructure, these efforts have not been matched by the local exchange carriers, which lag behind in advanced technology.

The competitive long-distance industry has begun to offer wholly new products as well as improved conventional service. For customers in remote locations not served by local telephone service and for customers in other

countries, carriers connect directly to customers by satellite with Very Small Aperture Terminals. Long-distance carriers also offer video conferencing. Improvements in high-bandwith telecommunications have made the cost of video conferences fall dramatically in relation to the cost of travel.

Improvements in software have made possible the creation of virtual networks for large business customers of long-distance carriers. In place of dedicated circuits, these systems provide equivalent or better service at lower cost using public switched network facilities. Dialing, routing, and billing are specialized to the needs of the customer with advanced software.

An increasing fraction of total long-distance traffic carries data rather than voice. Long-distance carriers have recently developed frame relay packet-switching service for sending bursts of data over circuits that can be shared with many other customers. A related new product is switched multi-megabit data service, for moving huge volumes of data at very high speeds. Also in this family of products is Asynchronous Transfer Mode, or cell-switching, which transports voice, data, images, and video. As the switched networks of the long-distance carriers have developed enhanced data capabilities, customers have moved from private data networks to virtual networks operating on their switched networks.

Conclusions

Divestiture and the opening of the long-distance market to competition have produced a vibrant, successful long-distance industry in the United States. Since competition was introduced to the long-distance market,

there has been a large and continuing flow of technological innovations. The performance of the industry in the past decade has been a clear success, with substantial declines in prices relative to other products and the rapid development and dissemination of advanced technologies by the competitive long-distance carriers.

Chapter 2. Current and Prospective Competition

Current Competitive Conditions in the Long-Distance Industry

The domestic long-distance industry in the United States has the following competitive structure: There are three carriers with complete national networks (AT&T, MCI, and Sprint). Their current market shares are roughly 60 percent, 16 percent, and 10 percent, respectively. There are several other large carriers with annual revenues over $100 million, including LDDS, WilTel, Cable & Wireless, and Allnet. In addition, several hundred other carriers have smaller roles in the industry, based on their own facilities, capacity leased from other owners, and on reselling capacity from other carriers. Some of AT&T's services are regulated by the FCC through price caps, which are upper limits on the average prices of broad categories of services. The other carriers are subject to even more streamlined regulation.

Although the three largest carriers–AT&T, MCI, and Sprint–together account for a large fraction of all long-distance traffic, the competitive role of

the smaller carriers is not insignificant. In particular, a number of the smaller carriers could expand rapidly if inadequate competition among the large carriers left prices above competitive levels. The smaller carriers thrive on the availability of fiber capacity in the lease market. One carrier, WilTel, has an important specialty in building and leasing fiber capacity to other long-distance carriers. Its lease customers include the major carriers as well as the smaller interexchange carriers. Consolidation among the smaller carriers has resulted in a smaller number of more successful entities, such as LDDS, which recently underwent a three-way merger. The new entity is expected to be profitable on about $1.3 billion in annual revenue in 1993. Another carrier, Allnet Communications Services, specializes in long-distance services for small and medium-sized businesses. Allnet offers nationwide service over leased transmission facilities that are all digital. It is profitable on revenue of about $400 million.

Because AT&T remains much the largest long-distance carrier, an analysis of competition based purely on market shares would reach an ambiguous conclusion. For example, the Department of Justice's screening criteria for mergers, based on market shares, would forbid a merger between AT&T and either MCI or Sprint. Although market share information is useful, it is important to examine a broader set of information than just market shares to analyze the state of competition in a market. In particular, economists consider barriers to entry and the prospective profits of a new entrant. In a non-competitive industry with conspicuous barriers to entry, a new firm would make high profits if it could overcome the barriers. In long distance, regulation created an absolute barrier to entry until the late 1970s.

Prospective entrants knew they could make substantial profits if they were allowed to compete with AT&T, and were willing to fight hard for the right.

Potential barriers to entry in the long-distance industry include the cost of creating a network of sufficient size to compete effectively with existing carriers and the cost of attracting customers from those carriers. It is important to point out that entry at the national level today, with a complete new network of transmission facilities, would cost billions of dollars and would be unlikely to be profitable. It is precisely the favorable state of competition that makes such entry unprofitable. If the existing long-distance carriers were charging prices well above costs and providing substandard service, the prospective profits to full-scale entry would be enough to induce the necessary large investment, exactly because there are no artificial barriers to entry in the long-distance market.[9]

Full-scale national entry is not the only form that new competition would take if the long-distance industry failed to perform adequately. Today, the industry has numerous smaller players occupying niches. Entry is possible at smaller scale by building facilities over selected routes, by leasing existing fiber capacity, and by reselling the services of other carriers. There is an active lease market for fiber transmission facilities to support this type of competition. Again, if failure of competition among the larger players created high prices and poor service, the smaller players would expand to take advantage of the profit opportunities that situation would create. The technology of long-distance telephone service is well suited to competitive

[9] An example of an artificial barrier to entry would be a crucial patent held by one of the carriers.

discipline because increasing returns are mild and successful rivals can remain permanently viable.

Federal telecommunications policy has found the right answer to giving all carriers an equal shot at capturing the business of a given long-distance customer. Before divestiture, virtually every customer was a captive of AT&T, whereas now equal access rules make it possible for the customer to switch easily to another carrier, if the customer's existing carrier is too pricey or has poor service. In almost all cases, the customer need not change any equipment or dialing habits. No artificial barrier to entry arises from the locking in of customers to carriers.

Another important index of performance is profit. Where competition is weak, firms can overprice their products and enjoy abnormal profits from their market power. The table below shows recent operating results for the three largest carriers. In 1992, AT&T, for example, earned about $2.3 billion from its long-distance operations, before interest and after taxes. AT&T's assets in long distance were about $24.2 billion, so its rate of return on its assets was 9.7 percent. MCI's return on assets was 9.0 percent, and Sprint's was 7.0 percent. These returns tend to fall below the return allowed for regulated telephone entities, in the neighborhood of 11 percent.

Return on Assets for the Three Largest Carriers, 1992

	AT&T	MCI	Sprint
Operating income net of taxes (millions of dollars)	2,339	857	220
Assets (millions of dollars)	24,160	9,678	4,635
Return on assets	9.7%	9.0%	7.0%

Although AT&T still has a large share of the U.S. long-distance market, the performance of the industry suggests a high degree of competition. The only factor limiting the entry of new players or the expansion of existing ones into the core of the industry is the modest prospective profit from entry or expansion, which is the result of the substantial competition already existing in the industry today.

Peter Huber's Analysis of Competition in Long Distance

Peter Huber and his colleagues have issued an update of their earlier work on the telephone business entitled *The Geodesic Network II: 1993 Report on Competition in the Telephone Industry.*[10] Chapter 3 of the report deals with the long-distance industry. Though the chapter concludes that no regulatory or structural change could improve the performance of the industry, it reaches that conclusion from a pessimistic diagnosis: "...the long-distance market can best be described as a stable oligopoly, propped up by regulation, and operating under an AT&T-supplied canopy of umbrella pricing." (p. 3.52) An important premise of the diagnosis is that the industry is a natural monopoly; it would have only a single seller, AT&T, if the FCC

[10]Peter W. Huber, Michael K. Kellogg, and John Thorne, The Geodesic Company, Washington D.C., 1993

did not keep the other carriers in business through implicit subsidies. The chapter also sets forth a theory of inefficient oligopoly in the industry.

One of the premises of Huber's conclusion that long distance is a natural monopoly is the existence of excess capacity in fiber networks. The theoretical capacity of existing fiber networks is several times greater than current demand. As fiber technology continues to improve, the cost of fiber will decline further and unused capacity will rise. A second premise is that a carrier at AT&T's scale has an important advantage in access cost over rivals of the size of MCI or Sprint. Huber believes that, if AT&T were free of regulatory and antitrust constraints, it would quickly demolish its rivals through its cost advantage and then enjoy the full benefits of monopoly.

The incremental cost of fiber capacity is such a small part of the total cost of long-distance service that the cost cannot have an important role in determining the price of long distance. Given the tiny incremental cost of fiber, every carrier that has built fiber capacity has installed plenty of extra capacity. Nothing about the economics of fiber gives AT&T an advantage over its rivals.

Networks do have some sources of increasing returns to scale. We cannot expect the long-distance business to satisfy the conditions of textbook perfect competition, which is incompatible with any degree of returns to scale. But the evidence suggests that the increasing returns are sufficiently mild as to be consistent with effective competition among a number of viable rivals. Huber notes that the FCC has a policy that access charges should be equal across long-distance carriers, rather than reflecting AT&T's scale economies and the generally closer locations of its facilities to those of the local

telephone companies (often because of their common ownership before 1984). Absent this policy, Huber believes, the other carriers would not be commercially viable.

Though AT&T's rivals have obviously fought to retain the equality of access charges, Huber's claim that they are essential for viability seems much overstated. Both MCI and Sprint, for example, have been particularly successful in selling long-distance services to large businesses. In that market, the price of switched access through the local phone company is irrelevant because the customer uses dedicated access, which is priced on the basis of distance. As a result, MCI and Sprint have no special advantage in that market.

Huber sees the long-distance industry as a natural monopoly forced to be an oligopoly by subsidies operating through access charges and by AT&T's fear of antitrust prosecution should it push a rival under.

Huber states that the exclusive source of reductions in the price of long distance since divestiture is declining access cost and competition has had essentially nothing to do with the declines. As support, the chapter relies entirely on the study by William Taylor discussed earlier in this report. Like Taylor, Huber and his colleagues have not looked directly at the available measures of long-distance prices adjusted for access charges. Although Huber is critical of the effects of price-cap regulation, nowhere does the chapter mention that, under the price cap regime, AT&T's long-distance prices have fallen not only by the full amount of access charge reductions, but by the additional three percent per year required by the price-cap regulations. And the declines for 800 and non-dialed services have been even greater.